

## Study on *Eucoenogenes* Meyrick (Lepidoptera: Tortricidae), with a newly recorded species from China

Aihuan ZHANG<sup>1</sup>, Houhun LI<sup>2①</sup>

1. Beijing Key Laboratory for Agricultural Application and New Technique, College of Plant Science and Technology, Beijing University of Agriculture, Beijing 102206, China

2. College of Life Sciences, Nankai University, Tianjin 300071, China

**Abstract:** The genus *Eucoenogenes* Meyrick is known from the Palaearctic and Oriental regions. In the present paper, two species of the genus *Eucoenogenes* are recognized from China. *E. ancyrota* (Meyrick, 1907) is reported in detail for the first time in China. Some characters of male genitalia are increased and variation of uncus between specimens from China and other areas is remarked. A key to the species of *Eucoenogenes* is provided based on the characters of male genitalia. The photographs of adult and male genitalia of *E. ancyrota* are given.

**Key words:** Eucosmini; taxonomy; key

### 中国绿小卷蛾属 *Eucoenogenes* 研究及一新纪录种记述（鳞翅目：卷蛾科）

张爱环<sup>1</sup>, 李后魂<sup>2①</sup>

1. 农业应用新技术北京市重点实验室, 北京农学院植物科学技术学院, 北京 102206; 2. 南开大学生命科学学院, 天津 300071

**摘要:** 绿小卷蛾属 *Eucoenogenes* 已知分布于古北区及东洋区。本文记述了中国绿小卷蛾属 2 种, 其中 *E. ancyrota* (Meyrick, 1907) 为新纪录种, 文中增加了该种的一些雄性外生殖器特征, 讨论了来自中国与其他地区标本的爪形突变。并提供了基于雄性外生殖器的绿小卷蛾属分种检索表及 *E. ancyrota* (Meyrick, 1907) 成虫及雄性外生殖器图。

**关键词:** 花小卷蛾族; 分类; 检索表

## Introduction

The genus *Eucoenogenes* was proposed by Meyrick (1938) as a replacement name of *Caenogenes* Meyrick, 1937 which was preoccupied by *Caenogenes* Walsingham, 1887. Diakonoff (1950) stated *Eucoenogenes* Meyrick must be sunk as a syn. of *Episimus* Walsingham, but later *Eucoenogenes* is always treated a valid genus. Diakonoff (1967) reported another species, *E. deltostoma*, from the Philippine Islands. Kuznetsov (1976, 1988) transferred three species to *Eucoenogenes*: *E. aestuosa* (Meyrick), *E. teliferana* (Christoph) and *E. cyanopsis* (Meyrick). Kawabe (1978, 1989) described two species: *E. japonica* from Japan and *E. euphlebia* from Thailand. Inoue *et al.* (1982) transferred *Epinotia ancyrota* to *Eucoenogenes*. Then Kuznetsov (1997a, b) described *E. levatana* and *E. segregana* from

---

Accepted 27 July 2016. Published 25 March 2017. Published online 17 March 2017.

① Corresponding author, E-mail: lihoun@nankai.edu.cn

Vietnam. Zhang & Li (2005) and Pinkaew *et al.* (2005) reported two species from China and Thailand respectively. Subsequently Horak (2006), Pinkaew (2008) and Zhang & Li (2011) transferred eleven species of *Eucoenogenes* to *Fibuloides*. Razowski (2009) added two species (*E. atripalpa* Razowski and *E. sipanga* Razowski) from Vietnam. Up to date, *Eucoenogenes* Meyrick includes only five species distributed in Palaearctic and Oriental regions (Gilligan *et al.* 2014).

In China only *E. teliferana* (Christoph) was recorded prior to this study (Razowski 1999; Zhang & Li 2005). During our study on Olethreutine moths, *E. ancyrota* (Meyrick, 1907) is firstly discovered in China. It has been recorded feeding on the leaves of *Ternstroemia japonica* Thunb. (Theaceae) (Kawabe 1982; Byun & Shin 1999), which is a kind of common cultivated plant in the botanical garden. While in China the host plant and the number of generation per year is unknown. In the collection locality, the plants of Theaceae (eg. *Camellia reticulata* Lindl.) are distributed widely, which may be the possible host plant of *E. ancyrota*. This deserves further study. In the present paper *E. ancyrota* (Meyrick) is redescribed in detail along with a key to all the species of *Eucoenogenes* based on characters of male genitalia. Some characters of male genitalia are increased and variation of uncus between specimens from China and other areas is remarked. The photographs of adult and male genitalia of *E. ancyrota* are provided.

## Material and methods

The study is based on examination of the specimens collected by light traps from forests and mountains in China.

Genitalia dissection and mounting methods follow Li (2002). Images of the adults were taken with a Nikon D300 digital camera with a macro lens and images of the genitalia were captured with an Olympus C-7070 digital camera attached to an Olympus BX51 microscope.

Forewing pattern and terminology follows Brown & Powell (1991) as modified and discussed by Baixeras (2002).

All the specimens examined are deposited in the Insect Collection, College of Life Sciences, Nankai University, Tianjin, China.

Abbreviations. TL—type locality; TD—type depository; BMNH—Natural History Museum, London, United Kingdom; ZMAS—Zoological Museum of the Russian Academy of Sciences, St. Petersburg, Russia.

## Taxonomy

### *Eucoenogenes* Meyrick, 1938

*Eucoenogenes* Meyrick, 1938, *Transactions of the Royal Entomological Society of London*, 89: 49. [replacement name for *Caenogenes*]

*Caenogenes* Meyrick, 1937, *Exotic Microlepidoptera*, 5: 159. [preoccupied]

*Eucoegenes*: Byun & Shin, 1999, *Korean Journal of Applied Entomology*, 38: 15. [misspelling of *Eucoenogenes*]

Type species: *Caenogenes melanancalis* Meyrick, 1937.

Distribution. Palaearctic and Oriental regions.

Remarks. Meyrick (1937) described the type species, *Caenogenes melanancalis*, based on two specimens reared from larvae mining leaves of *Eugenia jambolana* Lamark (Myrtaceae) from India. Clarke (1958) designated a female as lectotype, noting that “the male is missing”, even though Meyrick indicated that both specimens were females in his original description. As the male of the type species, *Caenogenes melanancalis*, is unknown, the concept of the genus relies only on the female lectotype. Pinkaew (2005) made a detailed discussion and thought that the evidence was lacking to associate the lectotype with any other genera. With some species of *Eucoenogenes* Meyrick transferred to *Fibuloides* Kuznetsov, only five species were maintained in *Eucoenogenes* now. But they display a wide range of variation on some characters, including forewing pattern and the shape of uncus, socius, valva and cucullus *et al.* These species are assigned in *Eucoenogenes* at present because no other more appropriate generic assignment can be made. Only if the male of *E. melanancalis* is discovered, the generic characters can be complete and subsequently the problem of species assignment can be solved successfully.

### Key to species of *Eucoenogenes* based on male genitalia

(*E. melanancalis* (Meyrick) excluded)

1. Neck of valva indistinct, slightly narrower than base; valva with row of setae between cucullus and basal opening and a triangular lobe on posterior edge of basal opening (Razowski, 2009: 135, fig. 14) ..... *E. atripalpa* Razowski
- Neck of valva distinct, much narrower than base; valva without row of setae between cucullus and basal opening and lobe on posterior edge of basal opening ..... 2
- 2 Socius slender, drooping; sacculus angle orthogonal; cucullus oval (Kuznetsov, 2001: 393, fig. 2) ..... *E. teliferana* (Christoph)
- Without integrated characters as above ..... 3
- 3 Uncus club-shaped, slightly dilated from basal 1/3 then narrowed from apical 1/3 to termination, with termination slightly concave and produced into two very minute projections apically; cucullus parallelogram-shaped, with three flattened long bristles ventrally ..... *E. ancyrota* (Meyrick)
- Uncus broad at base, narrowed to termination, bifurcated from apical 1/3 and produced into two triangular parts apically; cucullus nearly triangular, without flattened long bristles ventrally (Razowski, 2009: 135, fig. 15) ..... *E. sipanga* Razowski

#### 1. *Eucoenogenes ancyrota* (Meyrick, 1907) (Figs. 1–3), new record to China

*Epiblema ancyrota* Meyrick, 1907, *Journal of the Bombay Natural History Society*, 17: 733. TL: Sri Lanka, Ceylon [Sri Lanka] (Maskeliya); TD: BMNH.

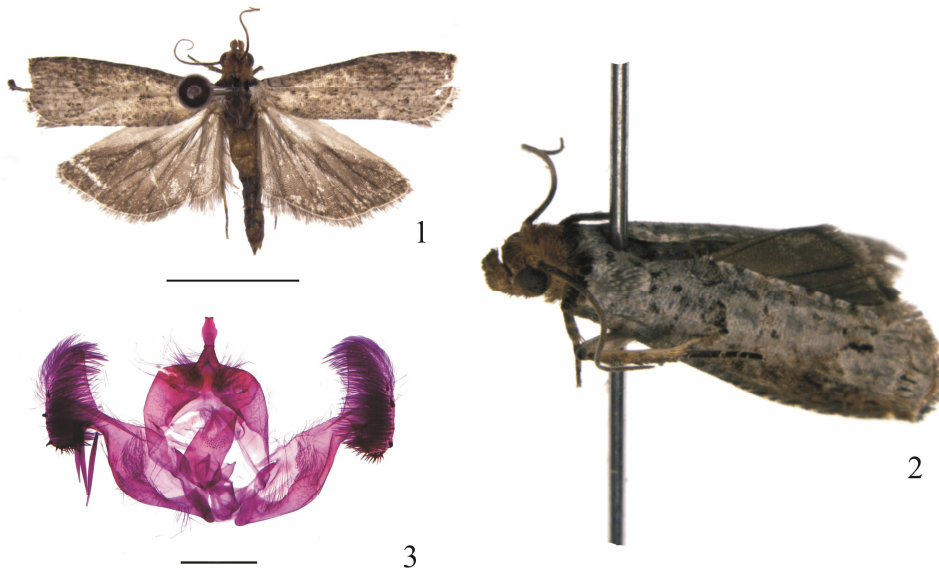
*Epinotia ancyrota*: Clarke, 1958, *Catalogue of the type specimens of Microlepidoptera in the British Museum (Natural History) described by Edward Meyrick*, 3: 335.

*Eucoenogenes ancyrota*: Kawabe, 1982, In: Inoue *et al.* (Eds.), *Moths of Japan*, 1: 120, 2: 174; Kawabe, 1989, *Microlepidoptera of Thailand*, 2: 82.

*Eucoegenes ancyrota*: Byun & Shin, 1999, *Korean Journal of Applied Entomology*, 38(1): 15 (misspelling of *Eucoenogenes*).

Adult (Figs. 1, 2). Vertex with gray scales; frons brown. Antennae light brown. Labial palpus gray intermixed with brown, slightly upturned, with second segment slightly dilated and third segment small. Thorax and tegula gray intermixed with light brown, darker toward abdomen. Forewing length 8.0–9.0 mm; elongate triangular, with ground color dark gray, reddish brown along costa; some light black dots scattered irregularly; basal patch indistinct;

ocellus nearly round, containing five tiny parallel blackish lines near termen; apex brown, protrudent; termen slightly concave below apex, bordered by brown scales; costa with five pairs of strigulae from half to apex; each pair of strigulae with a short brown stria extending obliquely; strigulae 1–2 between Sc and  $R_1$  points; distal three pairs distributed between pairs of veins  $R_1$ – $R_2$ ,  $R_2$ – $R_3$ ,  $R_3$ – $R_4$  respectively, separated from each other by dark brown scales; cilia gray mixed with brown. Costal fold about half in the male. Hindwing and cilia dark gray. Legs gray, tarsi with brown rings.



Figures 1–3. *Eucoenogenes ancyrota* (Meyrick). 1. Adult; 2. Lateral side of adult, labial palpi upturned; 3. Male genitalia, slide no. ZAH15029. Scales: 1 = 5 mm; 3 = 0.5 mm.

Male genitalia (Fig. 2). Tegumen broad, nearly square. Uncus club-shaped, basal half with few hairs, apical half naked, slightly dilated from basal 1/3 then narrowed from apical 1/3 to termination, with termination slightly concave and produced into two very minute projections. Socius broad and short, bending upward, hairy. A large triangular sclerites below socius respectively. Valva broad at base, deeply concave ventrally, neck distinct; sacculus with a weak lobe on ventral edge of basal opening, with numerous long hairs along ventral margin and short hairs between basal opening and sacculus margin; a weak fold parallel with sacculus margin before cucullus; cucullus parallelogram-shaped, hairy, outer margin with three stout spines, and with three flattened long bristles ventrally. Phallus short; cornuti deciduous.

**Specimens examined. China:** 2♂, Weibaoshan, 28.18°N, 100.34°E, Dali, Yunnan Province, 2205 m, 31-VII-2014, coll. Kaijian TENG, Wei GUAN, Xiuchun WANG & Shurong LIU; 1♂, Taiyanghe National Forest Park, 22.68°N, 101.03°E, Pu'er, Yunnan Province, 1450 m, 05-VII-2015, coll. Kaijian TENG; 3♂, Wild Elephant Valley, 22.17°N, 100.87°E, Xishuangbanna, Yunnan Province, 762 m, 10-VII-2015, coll. Kaijian TENG & Xia BAI (genitalia slide no. ZAH15029).

Host plant. Theaceae: *Ternstroemia japonica* Thunb. (Byun & Shin, 1999).

Distribution. China (Yunnan); Korea; Japan; Thailand; India; Sri Lanka.

Remarks. The Chinese specimens are similar to those from Japan, Korea and Thailand in appearance but there are a few variations on character of uncus. In Chinese specimens uncus is club-shaped, basal half with few hairs and apical half naked, slightly dilated from basal 1/3 then narrowed from apical 1/3 to termination, and termination slightly concave and produced into two very minute projections. While in the specimens from other areas uncus is short, small, narrowed to termination, sharpened apically.

## 2. *Eucoenogenes teliferana* (Christoph, 1881)

*Grapholitha teliferana* Christoph, 1881, *Bulletin de la Société impériale des naturalists de Moscou*, 56(2): 415; Kennel, 1921, *Zoologica*, 21: 528. TL: Russia, Far East, PrimorskyKrai, Vladi-vostok; TD: ZMAS.

*Eucoenogenes teliferana*: Kuznetsov, 1976, *Trudy Zoologicheskogo Instituta Akademii Nauk SSSR*, 62: 83; Kawabe, 1982, In: Inoue *et al.* (Eds.), *Moths of Japan*, 1: 120, 2: 173; Razowski, 1999, *SHILAP Revista de Lepidopterología*, 27(108): 446; Kuznetsov, 2001, In: Ler (Ed.), *Key to the insects of Russian Far East*, 5(3): 402.

Host plant. Betulaceae: *Corylus mandschurica* Maxim. (Kuznetsov, 2001).

Distribution. China (Northeast Part); Korea; Japan; Russia.

Remarks. In our study the specimens of *E. teliferana* have not been collected. Its information about host plant and distribution are from literature cited.

## Acknowledgments

The authors are grateful to Dr. Baoyu LI of Chinese Academy of Agricultural Sciences, Beijing, China and Dr. Nantasak Pinkaew of Department of Entomology, Kasetsat University, Bangkok, Thailand for gathering some helpful information used in this study. We also express our sincere thanks to everyone for collecting specimens. The research was supported by the National Natural Science Foundation of China (31101665, J0630963) and Beijing Higher Education Young Elite Teacher Project (YETP1716).

## References

- Baixeras J. 2002. An overview of genus-level taxonomic problems surrounding *Argyroploce* Hübner (Lepidoptera: Tortricidae), with description of a new species. *Annals of the Entomological Society of America*, 95(4): 422–431.
- Brown RL & Powell J. 1991. Description of a new species of *Epiblema* (Lepidoptera: Tortricidae: Olethreutinae) from coastal redwood forests in California with an analysis of the forewing pattern. *The Pan-Pacific Entomologist*, 67(2): 107–114.
- Byun BK & Shin CH. 1999. *Eucoegenes ancycrota* (Meyrick) (Lepidoptera, Tortricidae) attacking to *Ternstroemia japonica* Thunb. new to Korea. *Korean Journal of Applied Entomology*, 38(1): 15–17.
- Clarke JFG. 1958. Catalogue of the Type Specimens of Microlepidoptera in the British Museum (Natural History) described by Edward Meyrick. *Trustees of the British Museum*, 3: 1–600.
- Diakonoff A. 1950. The type specimens of certain oriental Eucosmidae and Carposinidae (Microlepidoptera) described by Edward Meyrick together with descriptions of new Eucosmidae and Carposinidae in the

- British Museum (Natural History). *Bulletin of the British Museum (Natural History) Entomology*, 1(4): 275–300.
- Diakonoff A. 1967. Microlepidoptera of the Philippine Islands. *Bulletin of the United States National Museum*, 257: 1–484.
- Gilligan TM, Baixeras J, Brown JW & Tuck KR. 2014. T@RTS: Online World Catalogue of the Tortricidae (Ver. 3.0). Available from: <http://www.tortricid.net/catalogue.asp>. (Accessed 30 January 2016).
- Horak M. 2006. Olethreutine moths of Australia (Lepidoptera: Tortricidae). *Monographs on Australian Lepidoptera*, 10: 1–522.
- Kawabe A. 1978. Descriptions of three new genera and fourteen new species of the subfamily Olethreutinae from Japan (Lepidoptera, Tortricidae). *Tinea*, 10(19): 173–191.
- Kawabe A. 1982. Tortricidae. In: Inoue H, Sugi S, Kuroko H & Kawabe A (Eds.), *Moths of Japan*. Kodansha, Tokyo, 1: 62–258, 2: 158–183.
- Kawabe A. 1989. Records and descriptions of the subfamily Olethreutinae (Lepidoptera: Tortricidae) from Thailand. *Microlepidoptera of Thailand*, 2: 23–82.
- Kennel J. 1908–1921. Die Palaearctischen Tortriciden. *Zoologica*, 21(54): 1–742.
- Kuznetsov VI. 1976. Leaf rollers of the tribe Eucosmini of the southern part of the Far East. *Trudy Zoologicheskogo Instituta Akademii Nauk SSSR*, 62: 70–108.
- Kuznetsov VI. 1988. New and little-known leaf-rollers of the subfamily Olethreutinae (Lepidoptera, Tortricidae) of the fauna of the North Vietnam. *Proceedings of the Zoological Institute*, 176: 72–89.
- Kuznetsov VI. 1997a. Little known and new species of tortricid moths (Lepidoptera, Tortricidae) of the fauna of Vietnam. *Entomologicheskoe Obozrenie*, 76(1): 186–202, 236.
- Kuznetsov VI. 1997b. New species of the subfamily Olethreutinae (Lepidoptera, Tortricidae) from the south of Vietnam. *Entomologicheskoe Obozrenie*, 76(4): 797–812, 953.
- Kuznetsov VI. 2001. Tortricodea: Olethreutinae: Eucosmini. In: Ler PA (Ed.), *Key to the insects of Russian Far East. Vol. V. Trichoptera and Lepidoptera. Pt. 3*. Dalnauka, Vladivostok, pp. 323–472.
- Li HH. 2002. The Gelechiidae of China (I) (Lepidoptera: Gelechioidea). Nankai University Press, Tianjin, 538 pp.
- Meyrick E. 1912. Descriptions of Indian Microlepidoptera. *Journal of the Bombay Natural History Society*, 21: 852–877.
- Meyrick E. 1936–1937. Exotic Microlepidoptera 5. Thornhanger, Marlborough, Wilts, 160 pp.
- Meyrick E. 1938. New Microlepidoptera, with notes on others. *Transactions of the Royal Entomological Society of London*, 89: 47–62.
- Pinkaew N. 2008. A new species and two new combinations in the genus *Fibuloides* Kuznetsov (Lepidoptera: Tortricidae: Eucosmini) from Thailand. *Zootaxa*, 1688: 61–65.
- Pinkaew N, Chandraptay A & Brown RL. 2005. Two new species and a new record of *Eucoenogenes* (Meyrick) (Lepidoptera: Tortricidae) from Thailand with a discussion of characters defining the genus. *Proceedings of the Entomological Society of Washington*, 107(4): 869–882.
- Razowski J. 1989. The genera of Tortricidae (Lepidoptera). Part II: Palaearctic Olethreutinae. *Acta Zoologica Cracoviensia*, 32(7): 107–328.
- Razowski J. 1999. Catalogue of the species of Tortricidae. Part V: Palaearctic Eucosmina and Enarmoniina (Insecta: Lepidoptera). *SHILAP Revista de Lepidopterología*, 27(108): 437–506.
- Razowski J. 2009. Tortricidae from Vietnam in the collection of the Berlin Museum. 6. Olethreutinae (Lepidoptera: Tortricidae). *SHILAP Revista de Lepidopterología*, 37(145): 115–143.
- Zhang AH & Li HH. 2005. A Study on the Genus *Eucoenogenes* from China (Lepidoptera: Tortricidae: Olethreutinae). *Entomotaxonomia*, 27(2): 125–130.
- Zhang AH & Li HH. 2011. Review of the genus *Fibuloides* Kuznetsov in China (Lepidoptera, Tortricidae, Olethreutinae). *ZooKeys*, 81: 39–50.